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| 10/500,124 | 06/25/2004 | Katsuhiko Takahashi | Q81414 | 7360 |
| 23373 | 7590 | 06/03/2009 | EXAMINER | |
| SUGHRUE MION, PLLC 2100 PENNSYLVANIA AVENUE, N.W. SUITE 800 WASHINGTON, DC 20037 | | | NGUYEN, KHANH TUAN | |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/500,124

Applicant(s)

TAKAHASHI ET AL.

Examiner

KHANH T. NGUYEN

Art Unit

1796

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on RCE filed on 05/19/2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 4-6, 9, 11-18 and 20-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 4-6, 9, 11-18 and 20-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 05/19/2009 has been entered.

Response to Amendment

2. The amendment filed on 05/19/2009 is entered and acknowledged by the Examiner. Claims 1, 4-6, 9, 11-18 and 20-24 are currently pending in the instant application. Claims 2-3, 7-8, 10 and 19 have been canceled.

3. The rejection of claims 1,5-6, 9-12, 14-17, and 20-24 under 35 U.S.C. 103(a) as being unpatentable over Johnson Matthey Co. Ltd. et al. (G.B. Pat. 566,718) in view of Morrison, Jr. (U.S. Pat. 5,242,623) is withdrawn in view of applicant's amendment.

4. The rejection of claims 1,4-6, 9, 13-18, and 20-24 under 35 U.S.C. 103(a) as being unpatentable over Kodas et al. (U.S Pat. 6,951,666 B2) in view of Morrison, Jr. (U.S. Pat. 5,242,623) is maintained for the reasons set forth therein. The rejection of claim 10 under 35 U.S.C. 103(a) as being unpatentable over Kodas et al. (U.S Pat.

6,951,666 B2) in view of Morrison, Jr. (U.S. Pat. 5,242,623) is rendered moot in view of the instant cancellation.

Claim Rejections - 35 USC § 103

5. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

6. The amendment to claims 1 and 13 are noted. However, the amended claims remain unpatentable over the prior art of record for the reasons set forth below.

7. Claim 1,4-6, 9, 11-18, and 20-24 under 35 U.S.C. 103(a) as being unpatentable over Kodas et al. (U.S Pat. 6,951,666 B2) in view of Morrison, Jr. (U.S. Pat. 5,242,623).

With respect to claims 1, 4-6, 9, 13-18, and 20-24, Kodas discloses precursor composition (i.e. electrically conductive paste) forming a thick-film on a substrate such as plastic by screen printing (Col. 1, lines 21-24; Col. 27, lines 3-23; Col. 29, lines 22-25; Col. 37, lines 64-68). The precursor composition may comprise of metal precursor of micron-sized or nanoparticle having two different particles size (i.e. bimodal), wherein the micron-sized particle (larger mode) has an average size of 1-10 μm and the **nano particle (smaller mode) has average size of about 10-100 nanometers, i.e. average particle size of about 0.01-0.10 μm** (Col. 4, lines 24-25; Col. 24, lines 45-48; and Col. 6, lines 4-20). The precursor composition further comprises of solvents, a vehicles, a reducing agent and other additives such as dispersant (Col. 2, lines 58-61 and Col. 4, lines 15-20). Kodas also discloses silver metal precursor are preferred, in particular,

silver nitrate, silver oxide and silver carbonate (Table 1, Col. 8, lines 63-67 and Col. 14, lines 18-19). Kodas discloses a method of obtaining the silver metal precursor by vapor deposition method such as CVD or PVD (Col. 6, lines 36-63). The reference further discloses a inducing agent (i.e. reducing agent) such as alpha terpineol (pine oil) or other low vapor pressure solvent such as diethylene glycol, ethylene glycol, hexylene glycol, NMP, tri(ethylene glycol) dimethyl ether and ethylene glycol diacetate capable of reducing silver oxide to silver at low temperature (Col. 13, lines 57-64, Col. 15, lines 46-53 and Table 4). The reducing agent is preferably at least about 20-60 weight percent (Col. 15, lines 21-28). Kodas discloses the electrically conductive paste composition may be printed onto a substrate (Col. 29, lines 10-21) and follow by heat treatment (Col. 29, lines 45-50) to form a metallic film (Col. 32, lines 46-52; and Table 6). Kodas further discloses a rheology modifier for improving particle dispersion is selected from styrene allyl alcohol, *ethyl cellulose*, *carboxyl methylcellulose*, *nitrocellulose*, polyalkylene carbonates, ethyl nitrocellulose and the (Col. 20, lines 46-55).

The difference between the instant application and Kodas disclosure is that Kodas suggest using ethyl cellulose, carboxyl methylcellulose and nitrocellulose instead of the claimed hydroxypropyl cellulose as a dispersant.

In an analogous are of screen printable thick film paste, U.S. '623 teaches a screen printable thick film paste useful as a conductive, resistive or dielectric material that can be applied onto an electrical insulating material such as alumina and ceramic (Col. 1, lines 13-16; Col. 2, lines 27-30 and line 59). The thick film resistor paste may contain resistive material such as metal oxides or noble metal (e.g. Ag) having a

preferred particle size in the range of 0.1-10 microns (Col. 2, lines 33-53). The metal oxides is mixed in an organic medium comprising of a resin selected from *ethyl cellulose*, *cellulose nitrate*, hydroxyethyl cellulose, ethylhydroxyethyl cellulose, *carboxymethyl cellulose*, hydroxypropyl cellulose and the mixture and the derivatives thereof dissolved in a solvent such as alpha- or beta-terpineol (*pine oil*) and alcohols (Col. 3, line 10 to Col. 4, line 9).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the screen printable thick film paste of Kodas by substituting the ethyl cellulose, carboxyl methylcellulose and nitrocellulose of Kodas with hydroxypropyl cellulose of U.S. '623 because such substitution is explicitly suggest by the prior art. The burden is upon the applicant to prove otherwise. *In re Fitzgerald*, 205 USPQ 594. In addition, the composition suggest by the prior art contains similar compounds as claimed, thus it would generally be expected to have similar properties (e.g. volume resistivity (W), specific gravity (X), the number of pores (Y) and viscosity as recited in claims 1, 9, 21, and 23) since it has been held by the court that structurally similar compounds are generally be expected to have similar properties. *In re Gvurik*, 596 F. 2d 1012, 201 USPQ 552. For example, both Kodas (Abstract) and U.S. '623 (Col 4, lines 30-40) teach a thick film paste composition having similar viscosity as the claimed composition. Furthermore, the court has held that compositions are indefinite for being defined in terms of properties alone. *Ex parte Spacht*, 165 USPQ 409 (PO Bd Pat App 1969); *Ex parte Slob* 157 USPQ 172 (PO Bd Pat. App 1967); *Ex parte Pulvari*, 157 USPQ 169 (PO Bd Pat. App 1966).

Claims 11 and 12 are product-by-process claims and are not limited to the manipulations of the recited steps, only the structure limited by the steps. Therefore, the patentability of the product does not depend on its method of production and the claimed steps were not given patentable weight. Any difference imparted by the product by process limitations would have been obvious to one having ordinary skill in the art at the time the invention was made because where the examiner has found a substantially similar product as in the applied prior art, the burden of proof is shifted to the applicant to establish that their product is patentably distinct, not the examiner to show the same process of making, see *In re Brown*, 173 USPQ 685 and *In re Fessmann*, 180 USPQ 324.

Regarding claim 20, the lower limit of the instant claim includes 0 (zero) parts of dispersant, hence, the reference need not teach the presence of dispersants.

Regarding claim 21, U.S. '623 discloses a viscosity within the claimed range (Col. 4, lines 30-40). Kodas discloses a viscosity of at least about 1000 centipoise, the viscosity of Kodas is at least about 10 poise (Abstract).

In view of the foregoing, the above claims have failed to patentably distinguish over the applied art.

Response to Arguments

8. Applicant's arguments filed on 05/19/2009 have been fully considered but they are not persuasive.

9. In response to the Applicant's remark on page 8, Applicant argues that U.S. Pat. 6,951,666 B2 to Kodas discloses a range of at least 0.1 μm and about 10 to 80 microns (0.01 to 0.08 μm). Accordingly, Kodas failed to disclose the range of the average particle diameter of the particulate silver compound in the range of more than 0.08 μm and less than 0.1 μm as recited in the amended claim 1. The examiner respectfully disagrees with the Applicant argument for two reasons.

First, Kodas teaches the **nanoparticles have an average size of not greater than about 100 nanometers**, such as from about 10 to 80 nanometers. Particularly preferred are nanoparticles having an average size in the range from about 25 to 75 nanometers. See column 4 lines 27-29. As applicant is aware a reference may be relied upon for all that it would have reasonably suggested to one having ordinary skill in the art, including non-preferred embodiments, see *Merck & Co. v. Biocraft Laboratories*, 874 F.2d 804, 10 USPQ2d 1843 (Fed. Cir.), *cert. denied*, 493 U.S. 975 (1989). See MPEP 2141.02, MPEP 2145X.D.I and MPEP 2123. That is, while the preferred silver compound particle size of Kodas (i.e. about 25 to 75 nanometers) is not within the claimed range of more than 0.08 μm and less than 0.1 μm , nonetheless the non-preferred embodiment of Kodas may be relied upon for all that it would have reasonably suggested to one having ordinary skill in the art to arrive at the claimed range. Specifically, the upper limit of a silver compound particle with an average particle size of **not greater than about 100 nanometers** lies within the claimed range of more than 0.08 μm and less than 0.1 μm . Thus, it would have been obvious to a skilled artisan at

the time the invention was made to incorporate a silver compound particle having the claimed range into an electrically conductive paste as suggested by Kodas.

Secondly, at column 6 lines 16-20 of Kodas, Kodas teaches the nanoparticle particles having a bimodal particle size distribution wherein the larger mode is 1-10 μm and **the smaller mode is about 10-100 nm (0.01-0.10 μm)**. The upper limit of about 100 nanometers lies within the claimed range of more than 0.08 μm and less than 0.1 μm . Thus, Kodas reference is considered to suggest an average particle diameter of the particulate silver compound in the range of more than 0.08 μm and less than 0.1 μm as recited in the amended claim 1. Please note, the "comprising" terminology of claim 1 leaves the claim open for the inclusion of unspecified ingredients (i.e. larger mode particles) even in major amounts, see *Ex parte Davis et al.*, 80 USPQ 448 (PTO Ed. App. 1948).

10. Applicant also argues, on page 9 of the remark, that Kodas discloses a volume resistivity being very close to the level of the volume resistivity of metallic silver. Moreover, applicant argues that since the present application has a structure that is not disclosed in Kodas, and exhibit a volume resistivity that is not disclosed in Kodas, the present application is not obvious. The examiner respectfully disagrees with the Applicant argument. As stated above, Kodas suggest a composition containing a silver compound having an average particle size within the claimed range. The composition of Kodas in view of U.S. '623 teaches each and every ingredient within the claimed proportions, thus the composition of Kodas as modified by U.S. '623 is expected to have

a volume resistivity as claimed. The applicant is reminded that the court has held that structurally similar compounds (i.e. electrically conductive paste) are generally expected to have similar properties (i.e. volume resistivity). In re Gvurik, 596 F. 2d 1012,201 USPQ 552. In the instant case, the prior arts teach a composition comprising of the same or substantially similar ingredients, i.e. silver compound having an average particle size of 10-100 nm, as recited in claim 1. Therefore, one having an ordinary skill in the art could expect the combination of silver compound, reducing agent, and dispersant as suggested by the prior art to have substantially similar properties as claimed, i.e. volume resistivity. The examiner noted that applicant has not submitted factual evidence showing that the composition of Kodas and U.S. '623 would not yield a composition having a volume resistivity within the claimed range of about 3.0×10^{-6} to about $8 \times 10^{-6} \Omega\text{cm}$. The USPTO is not equipped to perform laboratory testings and experimental benchworks to measure the properties of the resulting composition. The burden is on the applicant to prove otherwise.

Based on the above rational, it is believed that the claimed limitations are met by the reference submitted and therefore, the rejection is maintained.

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to KHANH T. NGUYEN whose telephone number is (571) 272-8082. The examiner can normally be reached on Monday-Friday 7:00-4:00 EST PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski can be reached on (571) 272-1302. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Mark Kopec/
Primary Examiner, Art Unit 1796

/KTN/
Examiner
06/02/2009